

**Annual Report: Distribution and prevalence of native Fire ants in the Balcones Canyonlands Preserve**

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**Overview**

Imported fire ants (*Solenopsis invicta*) invaded central Texas in the 1980's. They greatly depressed the diversity of co-occurring ants and arthropods in the systems they invaded (Camilo & Phillips 1990, Morris & Steigman 1993, Porter & Savignano 1990) although in some systems many impacts were transitory (Morrison 2002). The group mostly strongly impacted by *S. invicta* are the native fire ant species (*S. geminata*, *S. xyloni*, and *S. amblychila*) (Tschinkel 1988). Although healthy populations of these ant species exist outside of the range of imported fire ants in North America, these ants have been eliminated in most of their previous range in Texas and the southeastern United States (Tschinkel 2006).

Sampling work conducted in Wild Basin Preserve in 2103 under a separate project permit granted to Dr. Allan Hook revealed the presence of dense local populations of native fire ants in some of the meadows of the preserve. Pitfall trap residues from these meadows contained a diverse group of ant species including dense populations of native fire ants (*S. geminata*, and *S. aurea*) as well as low density imported fire ants. This species assemblage contrasts strongly with other Edwards Plateau ant assemblages sampled by E. LeBrun which have been uniformly characterized by dense populations of imported fire ants and an absence of native fire ant species. The meadows sampled in Wild Basin are largely isolated from the surrounding suburban and rangeland matrix by juniper woodlands, an environment unsuitable to imported fire ants. The suggestion then is that more isolated meadows within the preserve system may contain ant assemblages more reflective of the pre-imported fire ant invasion assemblages of central Texas.

*Intended use of results*

The results will be used to plan future research into co-existence between native and imported fire ants. There is no commercial application for these results.

*Objective*

Our objective is to assay the ant assemblages within isolated and less isolated meadows within the Balcones Canyonlands preserve system to determine the prevalence of native fire ants within the preserve. We also wish to characterize the composition of the ant assemblages associated with native fire ant dominated meadows and a similar number of introduced fire ant dominated meadows to assess whether the species of fire ant impacts the richness or abundance of the remainder of the assemblage.

## **Methods**

### *Study Area*

### *Procedures*

Meadows were sampled by mapping the presence of all fire ant mounds with GPS. From each mound a sample of 30 workers was collected and identified to species. Pitfall traps, 50 ml centrifuge tubes with 3 cm diameter openings, were set, charged with soapy water and left open to collect ants for 1 week. The small diameter openings of these traps ensure that only ants and other small, primarily non-flying arthropods are captured. The non-toxic trapping fluid ensures that no vertebrates are at risk. Pitfall trapping allows for a much more comprehensive survey of the ant assemblage and quantifies relative abundance in a largely unbiased manner.

### *Collections*

Approximately 5-30 worker ants from each fire ant mound encountered were vouchered into ethanol. Worker ants are non-reproductive members social insect colonies that typically possess large worker populations, removal of these workers did not harm resident colonies. All specimens will ultimately be deposited into the UTIC (University of Texas Insect Collection).

## **Results and Discussion**

For a summary of the composition of the fire ant assemblages in the meadows see Table 1. Pitfall traps have not yet been sorted so there are no results to report at this time.

Across all meadows, many fewer native fire ant mounds were encountered in 2015 than 2013 (71 vs 133). Native fire ant mounds are not always evident at the surface, so it is difficult to assess whether this represents a decline in their abundances. Imported fire ants mounds showed the reverse trend being more abundant in 2015 than 2013 (136 vs 90). Imported fire ants tend to be more consistently present at the surface and as such this may represent a real change in abundance. However, almost all of the increase in imported fire ant abundance occurred in a single meadow (Table 1).

Based upon the mound survey data, the relative abundances of these two fire ant species across these meadows appear to exhibit a dynamic equilibrium. Native fire ants exhibited a strong decline in relative abundance in one meadow, and a strong increase in relative abundance in one meadow. Other meadows remained close to the relative abundances recorded in 2013 (Table 1). No systematic decline in native fire ants or increase in imported fire ants is evident.

There is no obvious relationship between the distance a meadow lies from the nearest road or developed area and the composition of the fire ant species that inhabit it.

More definitive assessments of compositional change over time will have to wait until the resources to sort the pitfall traps are available.

Table 1: Species composition of fire ant populations in select Balcones Canyonlands meadows.

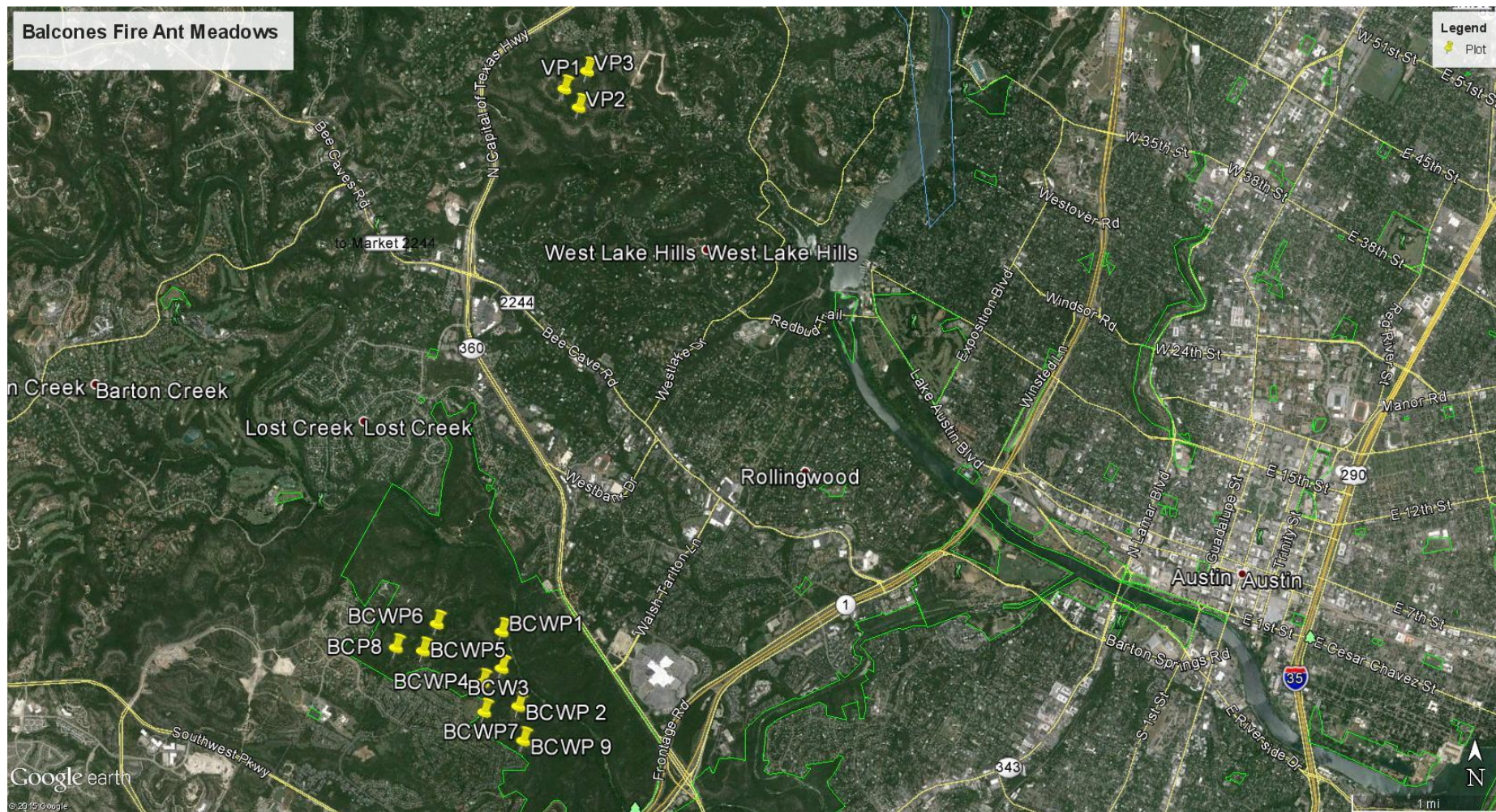
Meadow ID <sup>1</sup>	Latitude	Longitude	Meadow Area (acres)	2013 Total <i>S. geminata</i> colonies	2013 Total <i>S. invicta</i> colonies	2013 % of Fire Ants – Native <sup>2</sup>	2015 Total <i>S. geminata</i> colonies	2015 Total <i>S. invicta</i> colonies	2015 % of Fire Ants – Native <sup>2</sup>	2015-2013 Change in % of Fire Ant Colonies Native <sup>3</sup>	Distance from Development (m)	Distance from Road (m)
BCWP1	30.26056	-97.8249	1.087	39	12	76	39	21	65	-11	696	293
BCWP2	30.25347	-97.8231	0.831	25	2	93	11	0	100	7	292	292
BCWP4	30.25575	-97.827	0.477	19	16	54	10	1	90.90909	36.90909	39	244
BCWP5	30.25873	-97.8336	0.393	0	20	0	0	5	0	0	66	60
BCWP6	30.2613	-97.832	0.643	9	20	31	0	72	0	-31	350	121
BCWP7	30.25291	-97.8268	0.959	21	0	100	5	0	100	0	61	111
BCWP8	30.25905	-97.8365	0.442	0	20	0	0	37	0	0	194	109
BCWP9	30.2502	-97.8225	0.747	20	0	100	6	0	100	0	10	56
VP1	30.31213	-97.818	2.088	4	15	21	NS	NS	NS	NS	NS	NS
VP2	30.31037	-97.8164	0.947	0	0	NA	NS	NS	NS	NS	NS	NS
VP3	30.31382	-97.8155	1.928	30	14	68	NS	NS	NS	NS	NS	NS

<sup>1</sup> BCWP = Barton Creek Wilderness Preserve, VP = Vireo Preserve

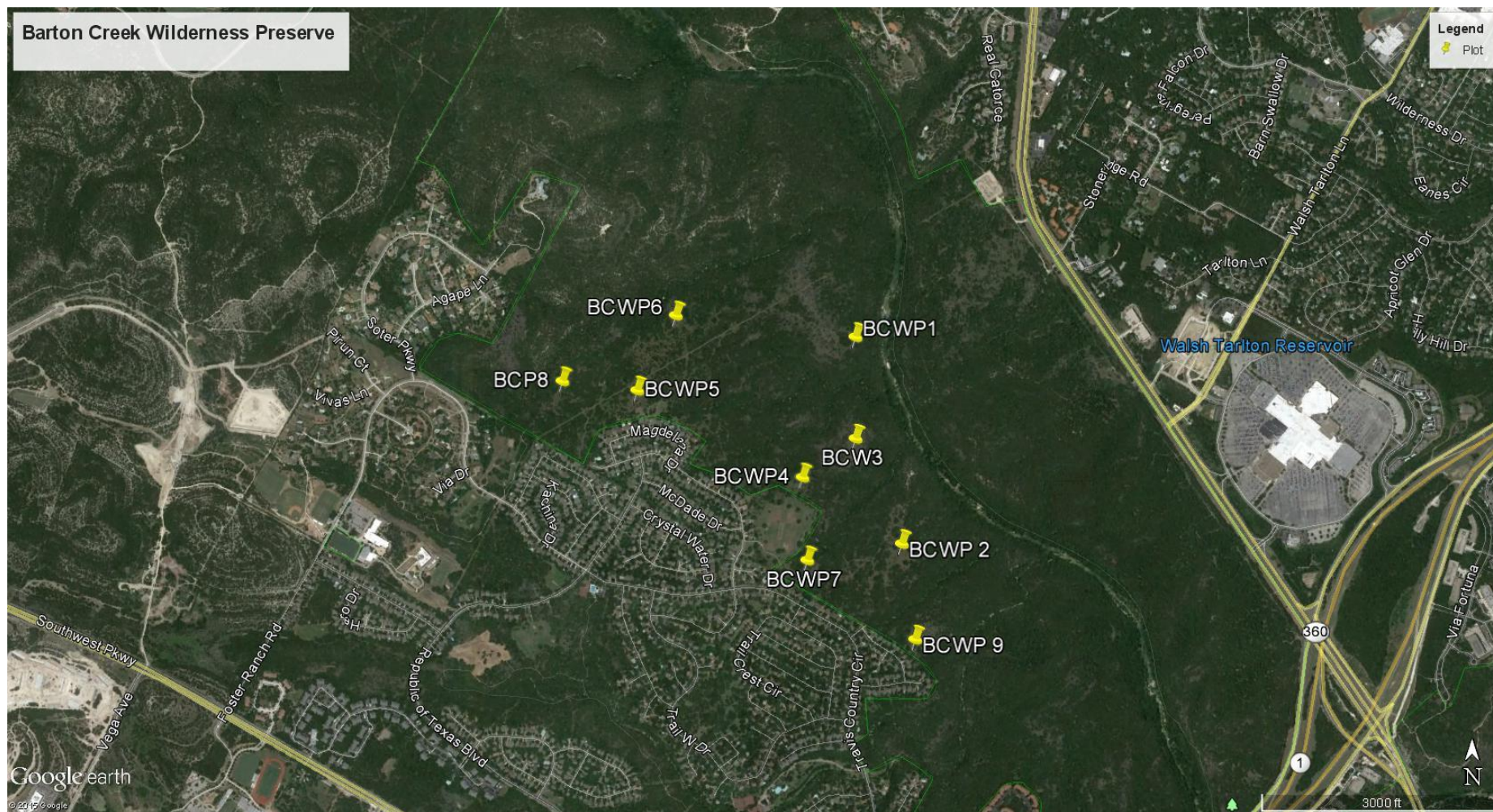
<sup>2</sup> Percent of all fire ant colonies encountered that were *S. geminata* or *S. aurea*.

<sup>3</sup> Difference between 2015 and 2013 (2015 – 2013) in the fraction of the fire ant assemblage comprised by native species.









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